

SEQUENCE LISTING

<110> Allen, Stephen M.
Rafalski, J. Antoni
Sakai, Hajime

<120> Nitrogen Transport Metabolism

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<150> 60/098,248

<151> 28 August 1998

<160> 14

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<210> 1

<211> 1037

<212> DNA

<213> Zea mays

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<212> PRT

<213> Zea mays

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Asn Ala Leu Ala Ala Arg Phe Arg Phe Asp Asp Pro Leu Glu Ala Ala
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 Tyr Gly Leu Phe Met Gly Gly Gly Gly Lys Leu Leu Ala Ala Gln Ile
 85 90 95
 Ile Gln Ile Leu Val Ile Ala Gly Trp Val Ser Cys Thr Met Gly Pro
 100 105 110
 Leu Phe Tyr Ala Leu Lys Lys Leu Gly Leu Leu Arg Ile Ser Ala Asp
 115 120 125
 Asp Glu Met Ser Gly Met Asp Leu Thr Arg His Gly Gly Phe Ala Tyr
 130 135 140
 Val Tyr His Asp Glu Asp Pro Gly Asp Lys Ala Gly Val Gly Gly Phe
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 <211> 1706
 <212> DNA
 <213> Glycine max

<400> 3

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 <211> 500
 <212> PRT
 <213> Glycine max

<400> 4
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 35 40 45
 Asn Thr Tyr Leu Leu Phe Ser Ala Tyr Leu Val Phe Ser Met Gln Leu
 50 55 60
 Gly Phe Ala Met Leu Cys Ala Gly Ser Val Arg Ala Lys Asn Thr Met
 65 70 75 80
 Asn Ile Met Leu Thr Asn Val Leu Asp Ala Ala Ala Gly Gly Leu Phe
 85 90 95
 Tyr Tyr Leu Phe Gly Phe Ala Phe Ala Phe Gly Ser Pro Ser Asn Gly
 100 105 110
 Phe Ile Gly Lys His Phe Phe Gly Leu Lys Asp Ile Pro Ser Ser Ser
 115 120 125
 Tyr Asp Tyr Ser Tyr Phe Leu Tyr Gln Trp Ala Phe Ala Ile Ala Ala
 130 135 140
 Ala Gly Ile Thr Ser Gly Ser Ile Ala Glu Arg Thr Gln Phe Val Ala
 145 150 155 160
 Tyr Leu Ile Tyr Ser Ser Phe Leu Thr Gly Phe Val Tyr Pro Val Val
 165 170 175
 Ser His Trp Phe Trp Ser Pro Asp Gly Trp Ala Ser Ala Phe Lys Ile
 180 185 190
 Thr Asp Arg Leu Phe Ser Thr Gly Val Ile Asp Phe Ala Gly Ser Gly
 195 200 205
 Val Val His Met Val Gly Gly Ile Ala Gly Leu Trp Gly Ala Leu Ile
 210 215 220
 Glu Gly Pro Arg Met Gly Arg Phe Asp His Ala Gly Arg Ala Val Ala
 225 230 235 240
 Leu Arg Gly His Ser Ala Ser Leu Val Val Leu Gly Thr Phe Leu Leu
 245 250 255
 Trp Phe Gly Trp Tyr Gly Phe Asn Pro Gly Ser Phe Asn Lys Ile Leu
 260 265 270

Leu Thr Tyr Gly Asn Ser Gly Asn Tyr Tyr Gly Gln Trp Ser Ala Val
 275 280 285
 Gly Arg Thr Ala Val Thr Thr Thr Leu Ala Gly Ser Thr Ala Ala Leu
 290 295 300
 Thr Thr Leu Phe Gly Lys Arg Val Ile Ser Gly His Trp Asn Val Thr
 305 310 315 320
 Asp Val Cys Asn Gly Leu Leu Gly Gly Phe Ala Ala Ile Thr Ala Gly
 325 330 335
 Cys Ser Val Val Glu Pro Trp Ala Ala Ile Val Cys Gly Phe Val Ala
 340 345 350
 Ser Ile Val Leu Ile Ala Cys Asn Lys Leu Ala Glu Lys Val Lys Phe
 355 360 365
 Asp Asp Pro Leu Glu Ala Ala Gln Leu His Gly Gly Cys Gly Thr Trp
 370 375 380
 Gly Val Ile Phe Thr Ala Leu Phe Ala Lys Lys Glu Tyr Val Lys Glu
 385 390 395 400
 Val Tyr Gly Leu Gly Arg Ala His Gly Leu Leu Met Gly Gly Gly Gly
 405 410 415
 Lys Leu Leu Ala Ala His Val Ile Gln Ile Leu Val Ile Ala Gly Trp
 420 425 430
 Val Ser Ala Thr Met Gly Pro Leu Phe Trp Gly Leu Asn Lys Leu Lys
 435 440 445
 Leu Leu Arg Ile Ser Ser Glu Asp Glu Leu Ala Gly Met Asp Met Thr
 450 455 460
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 Thr Thr Asp Glu
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<210> 5
 <211> 1991
 <212> DNA
 <213> Triticum aestivum

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<210> 6
<211> 494
<212> PRT
<213> Triticum aestivum

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 35             40             45

Ala Met Gln Leu Gly Phe Ala Met Leu Cys Ala Gly Ser Val Arg Ala
 50             55             60

Lys Asn Thr Met Asn Ile Met Leu Thr Asn Val Leu Asp Ala Ala Ala
 65             70             75             80

Gly Ala Leu Phe Tyr Tyr Leu Phe Gly Phe Ala Phe Ala Phe Gly Thr
 85             90             95

Pro Ser Asn Gly Phe Ile Gly Lys His Phe Phe Gly Leu Lys Asp Met
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Pro Gln Thr Gly Phe Asp Tyr Ser Phe Phe Leu Phe Gln Trp Ala Phe
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Ala Ile Ala Ala Ala Gly Ile Thr Ser Gly Ser Ile Ala Glu Arg Thr
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 165 170 175
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 180 185 190
 Phe Ala Gly Ser Gly Val Val His Met Val Gly Gly Ile Ala Gly Phe
 195 200 205
 Trp Gly Ala Leu Ile Glu Gly Pro Arg Ile Gly Arg Phe Asp His Ala
 210 215 220
 Gly Arg Ser Val Ala Leu Lys Gly His Ser Ala Ser Leu Val Val Leu
 225 230 235 240
 Gly Thr Phe Leu Leu Trp Phe Gly Trp Tyr Gly Phe Asn Pro Gly Ser
 245 250 255
 Phe Val Thr Ile Leu Lys Ser Tyr Gly Pro Pro Gly Ser Ile Asn Gly
 260 265 270
 Gln Trp Ser Gly Val Gly Arg Thr Ala Val Thr Thr Thr Leu Ala Gly
 275 280 285
 Ser Val Ala Ala Leu Thr Thr Leu Phe Gly Lys Arg Leu Gln Thr Gly
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 His Trp Asn Val Val Asp Val Cys Asn Gly Leu Leu Gly Gly Phe Ala
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 Ala Ile Thr Ala Gly Cys Ser Val Val Asp Pro Trp Ala Ala Val Ile
 325 330 335
 Cys Gly Phe Val Ser Ala Trp Val Leu Ile Gly Leu Asn Ala Leu Ala
 340 345 350
 Gly Arg Leu Lys Tyr Asp Asp Pro Leu Glu Ala Ala Gln Leu His Gly
 355 360 365
 Gly Cys Gly Ala Trp Gly Ile Ile Phe Thr Ala Leu Phe Ala Lys Lys
 370 375 380
 Gln Tyr Val Glu Glu Ile Tyr Gly Ala Gly Arg Pro Tyr Gly Leu Phe
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 Leu Gly Gly Gly Gly Arg Leu Leu Ala Ala His Ile Val Gln Ile Leu
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 Val Ile Ala Gly Phe Val Ser Cys Thr Met Gly Pro Leu Phe Leu Ala
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 Leu Lys Lys Leu Gly Leu Leu Arg Ile Ser Ala Glu Asp Glu Met Ala
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 Gly Met Asp Leu Thr Arg His Gly Gly Phe Ala Tyr Val Tyr His Asp
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 <212> DNA
 <213> Zea mays

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 <211> 63
 <212> PRT
 <213> Zea mays

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Lys Trp Ala Val Asn Ser Ala Phe Met Ala Leu Tyr Ala Phe Ala
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<211> 1883
<212> DNA
<213> Oryza sativa

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<210> 10
<211> 497
<212> PRT
<213> Oryza sativa

<400> 10
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 35 40 45
 Gly Ser Ile Val Lys Lys Lys Trp Ala Val Asn Ser Ala Phe Met Ala
 50 55 60
 Leu Tyr Ala Tyr Ala Ser Thr Leu Ile Val Trp Val Leu Val Gly Phe
 65 70 75 80
 Arg Met Ala Phe Gly Asp Arg Leu Leu Pro Phe Trp Gly Lys Ala Gly
 85 90 95
 Ala Ala Leu Thr Glu Gly Phe Leu Val Ala Arg Ala Ser Val Pro Ala
 100 105 110
 Thr Ala His Tyr Gly Lys Asp Gly Ala Leu Glu Ser Pro Arg Thr Glu
 115 120 125
 Pro Phe Tyr Pro Glu Ala Ser Met Val Leu Phe Gln Phe Glu Leu Ala
 130 135 140
 Ala Ile Thr Leu Val Leu Leu Ala Gly Ser Leu Leu Gly Arg Met Asn
 145 150 155 160
 Ile Lys Ala Trp Met Ala Phe Thr Pro Leu Trp Leu Leu Phe Ser Tyr
 165 170 175
 Thr Val Cys Ala Phe Ser Leu Trp Gly Gly Gly Phe Leu Tyr Gln Trp
 180 185 190
 Gly Val Ile Asp Tyr Ser Gly Gly Tyr Val Ile His Leu Ser Ser Gly
 195 200 205
 Ile Ala Gly Phe Thr Ala Ala Tyr Trp Val Gly Pro Arg Leu Lys Ser
 210 215 220
 Asp Arg Glu Arg Phe Ser Pro Asn Asn Ile Leu Leu Met Ile Ala Gly
 225 230 235 240
 Gly Gly Leu Leu Trp Leu Gly Trp Ala Gly Phe Asn Gly Gly Ala Pro
 245 250 255
 Tyr Ala Pro Asn Ile Thr Ala Ser Ile Ala Val Leu Asn Thr Asn Val
 260 265 270
 Ser Ala Ala Ala Ser Leu Leu Thr Trp Thr Cys Leu Asp Val Ile Phe
 275 280 285
 Phe Gly Lys Pro Ser Val Ile Gly Ala Val Gln Gly Met Met Thr Gly
 290 295 300
 Leu Val Cys Ile Thr Pro Gly Ala Gly Leu Val His Thr Trp Ala Ala
 305 310 315 320
 Ile Leu Met Gly Ile Cys Gly Gly Ser Leu Pro Trp Phe Ser Met Met
 325 330 335
 Ile Leu His Lys Arg Ser Ala Leu Leu Gln Lys Val Asp Asp Thr Leu
 340 345 350

Ala Val Phe His Thr His Ala Val Ala Gly Leu Leu Gly Gly Phe Leu
355 360 365

Thr Gly Leu Phe Ala Leu Pro Asp Leu Thr Ala Val His Thr His Ile
370 375 380

Pro Gly Ala Arg Gly Ala Phe Tyr Gly Gly Gly Ile Ala Gln Val Gly
385 390 395 400

Lys Gln Ile Ala Gly Ala Leu Phe Val Val Val Trp Asn Val Val Ala
405 410 415

Thr Thr Val Ile Leu Leu Gly Val Gly Leu Val Val Pro Leu Arg Met
420 425 430

Pro Asp Glu Gln Leu Lys Ile Gly Asp Asp Ala Ala His Gly Glu Glu
435 440 445

Ala Tyr Ala Leu Trp Gly Asp Gly Glu Arg Phe Asp Val Thr Arg His
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485 490 495

Leu

<210> 11
<211> 1961
<212> DNA
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 35 40 45
 Val Lys Lys Lys Trp Ala Val Asn Ser Ala Phe Met Ala Leu Tyr Ala
 50 55 60
 Phe Ala Ala Val Leu Ile Cys Trp Val Leu Val Cys Tyr Arg Met Ala
 65 70 75 80
 Phe Gly Glu Glu Leu Phe Pro Phe Trp Gly Lys Gly Ala Pro Ala Leu
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 Gly Gln Lys Phe Leu Thr Lys Arg Ala Ile Val Ile Glu Thr Ile His
 100 105 110
 His Phe Asp Asn Gly Thr Val Glu Ser Pro Pro Glu Glu Pro Phe Tyr
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 Pro Met Ala Ser Leu Val Tyr Phe Gln Phe Thr Phe Ala Ala Ile Thr
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 Trp Met Ala Phe Val Pro Leu Trp Leu Ile Phe Ser Tyr Thr Val Gly
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 Ala Phe Ser Leu Trp Gly Gly Gly Phe Leu Tyr Gln Trp Gly Val Ile
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 Asp Tyr Ser Gly Gly Tyr Val Ile His Leu Ser Ser Gly Ile Ala Gly
 195 200 205
 Phe Thr Ala Ala Tyr Trp Val Gly Pro Arg Leu Lys Ser Asp Arg Glu
 210 215 220

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 Leu Trp Met Gly Trp Ser Gly Phe Asn Gly Gly Ala Pro Tyr Ala Ala
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 Thr Ser Leu Leu Val Trp Thr Thr Leu Asp Val Ile Phe Phe Gly Lys
 275 280 285
 Pro Ser Val Ile Gly Ala Val Gln Gly Met Met Thr Gly Leu Val Cys
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 Lys Lys Ser Thr Leu Leu Gln Lys Val Asp Asp Thr Leu Gly Val Phe
 340 345 350
 His Thr His Ala Val Ala Gly Leu Leu Gly Gly Leu Leu Thr Gly Leu
 355 360 365
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 370 375 380
 Arg Gly Ala Phe Tyr Gly Gly Gly Gly Gly Val Gln Phe Phe Lys Gln
 385 390 395 400
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 Ile Ile Leu Leu Val Ile Lys Leu Phe Ile Pro Leu Arg Met Pro Asp
 420 425 430
 Glu Gln Leu Glu Ile Gly Asp Asp Ala Val His Gly Glu Glu Ala Tyr
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 Ala Leu Trp Gly Asp Gly Glu Lys Tyr Asp Pro Thr Arg His Gly Ser
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 Gly Ala Phe Ser Val Trp Gly Gly Gly Phe Leu Phe His Trp Gly Val
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 195 200 205
 Gly Phe Thr Ala Ala Tyr Trp Val Gly Pro Arg Thr Lys Lys Asp Arg
 210 215 220
 Glu Ser Phe Pro Pro Asn Asn Ile Leu Phe Ala Leu Thr Gly Ala Gly
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 Leu Leu Trp Met Gly Trp Ala Gly Phe Asn Gly Gly Gly Pro Tyr Ala
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 Ala Ala Ser Leu Ile Val Trp Thr Cys Leu Asp Ala Val Phe Phe Lys
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 Lys Pro Ser Val Val Gly Ala Val Gln Ala Val Ile Thr Gly Leu Val
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 Cys Ile Thr Pro Gly Ala Gly Val Val Gln Gly Trp Ala Ala Leu Val
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 Met Gly Val Leu Ala Gly Ser Val Pro Trp Tyr Thr Met Met Val Leu
 325 330 335
 His Lys Arg Ser Lys Leu Leu Gln Arg Val Asp Asp Thr Leu Gly Val
 340 345 350
 Ile His Thr His Gly Val Ala Gly Leu Leu Gly Gly Val Leu Thr Gly
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 Leu Phe Ala Glu Pro Asn Leu Cys Asn Leu Phe Leu Pro Val Thr Asn
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 Ser Arg Gly Ala Phe Tyr Gly Gly Asn Gly Gly Ala Gln Leu Gly Lys
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 Gln Ile Ala Gly Ala Leu Phe Val Ile Gly Trp Asn Val Val Val Thr
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 Ser Ile Ile Cys Val Val Ile Arg Leu Val Val Pro Leu Arg Met Ser
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 Glu Glu Lys Leu Ala Ile Gly Asp Asp Ala Val His Gly Glu Glu Ala
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 Tyr Ala Leu Trp Gly Asp Gly Glu His Tyr Asp Asp Thr Lys His Gly
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